

*Keyes Report*

**Katherine Keyes, PhD Expert Report**

MDL Case Track 3  
*Case No. 1:18-op-45032 and No. 1:18-op-45079 Opioid Litigation*

**EXHIBIT A**

Curriculum Vitae

Exh. A-1



P-23117\_00001

*Keyes Report*

**Katherine M. Keyes, PhD**  
Department of Epidemiology  
Columbia University  
722 West 168th Street  
New York, NY 10032  
(212) 305-6706  
kmk2104@columbia.edu

**Date of Preparation:** April 9<sup>th</sup>, 2021

**Personal Data:**

Name: Katherine Keyes  
Birthplace: Minneapolis, MN  
Citizenship: USA

**Academic Appointments/Work Experience**

7/1/2016 – Present	<b>Department of Epidemiology</b> <b>Mailman School of Public Health, Columbia University</b> <i>Associate Professor of Epidemiology (tenured March 2020)</i>	New York, NY
2/1/2012 – 6/30/2016	<b>Department of Epidemiology</b> <b>Mailman School of Public Health, Columbia University</b> <i>Assistant Professor of Epidemiology</i>	New York, NY
11/15/2010 – 1/31/2012	<b>Mailman School of Public Health, Columbia University</b> <i>Instructor in Epidemiology</i>	New York, NY
7/1/2013 – 6/30/2016	<b>Department of Psychiatry</b> <b>Mailman School of Public Health, Columbia University</b> <i>Assistant Professor of Epidemiology (in Psychiatry)</i>	New York, NY
1/2015 – Present	<b>Survey Research Center, Institute for Social Research</b> <b>University of Michigan</b> <i>Adjunct Research Assistant Professor</i>	Ann Arbor, MI
7/2018 – Present	<b>Society and Health Research Center</b> <b>Universidad Mayor</b> <i>Adjunct Associate Professor</i>	Santiago, Chile

Exh. A-2

## Keyes Report

**Katherine M. Keyes, PhD**  
 Department of Epidemiology  
 Columbia University  
 722 West 168th Street  
 New York, NY 10032  
 (212) 305-6706  
[kmk2104@columbia.edu](mailto:kmk2104@columbia.edu)

**Compensation**

Reviewing materials and writing report: \$400 per hour  
 Deposition and trial testimony: \$550 per hour

## Keyes Report

<b>Education</b>		
09/2006 – 06/2010	<b>Columbia University, Mailman School of Public Health</b> PhD: Epidemiology, June 2010 Thesis title: <i>Ecologic-level disapproval and the prevalence of substance use: A multi-level age-period-cohort analysis of high-school attending adolescents in the United States</i> Sponsor: Deborah Hasin	New York, NY
09/2004 – 05/2006	<b>Columbia University, Mailman School of Public Health</b> MPH: Epidemiology, May 2006	New York, NY
09/1998 – 12/2001	<b>University of Minnesota</b> BS: Finance, BA: Theater Arts, December 2001	Minneapolis, MN
<b>Training</b>		
06/2010 – 01/2012	<b>Columbia University</b> <i>Epidemiology Merit Post-Doctoral Fellow</i>	New York, NY
09/2006 – 06/2010	<b>Columbia University</b> <i>Psychiatric Epidemiology Pre-Doctoral Training Fellow (T32 MH013043. PI: Link)</i>	New York, NY
<b>Honors and Awards</b>		
Carol J. Rowland Hogue Mid Career Award, Society for Epidemiologic Research, 2020		
NIH Early-Stage Investigator, Office of Disease Prevention, 2017		
Robins-Guze early career investigator award, American Psychopathological Association, 2016		
Michelle Tansella Award, World Psychiatric Association Epidemiology section, 2016		
Caledone Junior Faculty Prize, Mailman School of Public Health, Columbia University, 2016		
Tow Scholarship, Mailman School of Public Health, Columbia University, 2015		
Research Society on Alcoholism Young Investigator Award, 2015		
Columbia Psychiatric-Neurological Epidemiology Early Investigator Award, 2012		
Robert Wood Johnson Health and Society Scholars Fellowship, 2010 (declined)		
William Farr Award in Epidemiology, Columbia University, 2010		
Student Merit Travel Award, Research Society on Alcoholism, 2009		
Student award, Epidemiology Section, American Public Health Association, 2009		
First place, Division 50 Student Poster Competition, American Psychological Association, 2009		
National Institute of Drug Abuse Travel Award, American Psychological Association, 2009		
Student Merit Travel Award, Research Society on Alcoholism, 2008		
Gordis Award for outstanding student research, Research Society on Alcoholism, 2008		
Lilienfeld Prize for Student Research, Society for Epidemiologic Research, 2008		

Exh. C-2

Exh. A-3

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Student Merit Travel Award, Research Society on Alcoholism, 2007  
Finalist, Gordis Award for outstanding student research, Research Society on Alcoholism, 2007  
Women & Gender Junior Investigator Award, College on Problems of Drug Dependence, 2006  
Student Merit Travel Award, Research Society on Alcoholism, 2006

**Administrative Leadership and Academic Service**

ACADEMIC SERVICE

- Methods qualifying exam committee, 2015-present

ADMINISTRATIVE LEADERSHIP AT CUMC AND NYP

- Irving Institute for Clinical and Translational Research, KL2 career and training award reviewer, 2017-2019

**Professional Organization and Societies**

MEMBERSHIPS AND POSITIONS

American Psychopathological Association (2006-present)

- Nominations committee, 2013
- Robins-Guze early career investigator award recipient, 2017

Compensation

Research Society on Alcoholism (2006-present)

- Program committee, 2015-present
- Young Investigator Award recipient, 2015

Society for Epidemiologic Research (2007-present)

- Lilienfeld award recipient, 2008
- Education committee member, 2015-2018
- Education committee chair, 2019-present
- Member-at-Large, Executive committee, 2018-present
- Carol Hogue Mid-Career Award recipient, 2020

Society for Research on Child Development (2012-present)

- Thornberg Dissertation Award committee, 2014-2018
- Communications committee, 2017-2019

World Psychiatric Association Epidemiology and Public Health Section (2011-present)

- Michelle Tansella Award recipient, 2016
- Executive committee, 2016-present
- Local host of 2018 meeting, held at Columbia University, New York, May 2-4th, 2018

*NIH STUDY SECTIONS*

- NIAAA: AA1: Biomedical Research Review Subcommittee, November 9th, 2015
- NIAAA: AA1: Biomedical Research Review Subcommittee, July 11th, 2016
- NIDA: Special Emphasis Panel: PAR-16-24: Accelerating the Pace of Drug Abuse Research Using Existing Data, November 4th, 2016

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**Katherine Keyes, PhD Expert Report**

MDL Case Track 3

Case No. 1:18-op-45032 and No. 1:18-op-45079 Opioid Litigation

**EXHIBIT C**

Compensation

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*Keyes Report*

*All Expert Witness reports, from MDL 2804 served on March 25, 2019 and May 10, 2019 as well as materials identified within, and any supplements, errata, or attachments associated with them.*

*All Expert Witness reports from the NY Opioid Litigation 400000/2017 served on December 19, 2019 and February 3rd, 2020 as well as materials identified within and any supplements, errata, or attachments associated with them.*

*All Expert Witness reports from Cabell County Commission and City of Huntington, West Virginia, (The Cabell Huntington Community) v. AmerisourceBergen Drug Corporation, Cardinal Health, Inc., and McKesson Corporation served on August 3, 2020 as well as materials identified within, and any supplements, errata, or attachments associated with them.*

*All items referenced in Dr. Keyes's expert witness reports or listed on Materials Considered lists.*

*Keyes Report*

- NIAAA: AA2: Epidemiology, Prevention and Behavior Research Review Subcommittee, March 6th, 2017
- Social Sciences and Population Studies-B (SSPB) study section, June 15th, 2017
- NIAAA: AA1: Biomedical Research Review Subcommittee, July 14th, 2017
- NIAAA: AA2: Epidemiology, Prevention and Behavior Research Review Subcommittee, March 5th, 2018
- NIDA: Special Emphasis Panel: PAR-16-24: Accelerating the Pace of Drug Abuse Research Using Existing Data, March 1st, 2018
- CSR Special Emphasis Panel: Tobacco Control Policies to Reduce Health Disparities, March 29, 2019.
- NIAAA: AA2: Epidemiology, Prevention and Behavior Research Review Subcommittee, Standing member. 2019-present

*NATIONAL COMMITTEE MEMBERSHIP*

National Academy of Sciences, Engineering, and Medicine: Health and Medicine Division  
“Accelerating the Progress to Reduce Alcohol-Impaired Driving Fatalities”  
2017-2018

*JOURNAL REVIEWER (selection)*

Addiction; Alcoholism: Clinical and Experimental Research; American Journal of Epidemiology; American Journal of Psychiatry; American Journal of Public Health; Archives of General Psychiatry; BMC Psychiatry; British Journal of Psychiatry; Contemporary Drug Problems; Demography; Depression and Anxiety; Drug and Alcohol Dependence; Epidemiology; International Gambling Studies; International Journal of Epidemiology; JAMA; JAMA Pediatrics; JAMA Psychiatry; Journal of Nervous and Mental Diseases; Journal of Psychiatric Research; Journal of Traumatic Stress; Journal of Studies on Alcohol and Drugs; Molecular Psychiatry; New England Journal of Medicine; Preventive Medicine; PLoS One; Psychological Medicine; Social Psychiatry and Psychiatric Epidemiology; Social Science and Medicine; Substance Abuse Treatment, Prevention, and Policy; others.

*ABSTRACT REVIEW*

Society for Epidemiologic Research

*EDITORIAL BOARD*

*CURRENT*

- Drug and Alcohol Dependence, Associate Editor, 2015 to present
- American Journal of Public Health, guest editor, Special Issue: “Improving Population Mental Health in the 21st Century”, 2019
- Alcoholism: Clinical and Experimental Research, Field Editor, 2014 to present
- Injury Epidemiology, Associate Editor, 2013 to present

*FORMER*

- BMC Psychiatry, Associate Editor, 2011 to 2015

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- Social Psychiatry and Psychiatric Epidemiology, Editor of commentaries and editorials, 2014 to 2016

CONSULTING

Expert witness, National Prescription Opioid Litigation, Multi-district Litigation, Tracks 1, 1b, 2, 3, 4

Expert witness, New York State opioid litigation, retained by the People of the State of New York

**Fellowship and Grant Support**

PENDING RESEARCH FUNDING

**“Temperature, shade, and adolescent psychopathology; understanding how place shapes health”**

Role on Project: Co-Principal Investigator and Contact PI (with Andrew Rundle)

Dates of funding: 9/1/2021-8/31/2026

Funder: National Institute of Mental Health

Total annual direct and indirect costs: \$472,672

**“Standardized and Linked Real-World Data and Informatics Infrastructure to Study Post-Acute Sequelae of SARS-CoV-2 Infection across New York City” (PI: Pathak)**

Role on Project: Co-Investigator and PI of Columbia Subcontract

Dates of funding: 5/15/2021-5/14/2026

Funder: National Institutes of Health

Total direct and indirect costs: TBD

**“Leveraging the Social Media App Parler to Monitor Threats of Firearm and Other Violence: Implications for Prevention of Mass Violence”**

Role on Project: Principal Investigator

Dates of funding: 8/1/2021-7/30-2024

Funder: National Institute of Justice

Total direct and indirect costs: \$600,000

ACTIVE RESEARCH FUNDING

**“The representative brain: how sampling bias influences scientific discovery of the neural underpinnings of adolescent health”**

Seed Grant for Interdisciplinary Projects in Society and Neuroscience

Role on Project: Principal investigator

Dates of funding: 3/15/2021-4/15/2022

Funder: Presidential Scholars in Society and Neuroscience

Total direct and indirect costs: \$50,000

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1750. TRUM004839066

1751. TRUM004839199

1752. TRUM004839368

1753. TRUM004839415

1754. TRUM004839416

1755. TRUM004839417

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1772. TRUM004841233

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1776. TRUMBULL\_ESI\_000478042

1777. TRUMBULL\_ESI\_000478250

1778. WV – HUNT\_00063590

Exh. A-6

Exh. B-78

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1719. TRUM004707727  
1720. TRUM004707729  
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1746. TRUM004838234  
1747. TRUM004838235  
1748. TRUM004838239  
1749. TRUM004839063

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“Research Training Program in Psychiatric Epidemiology” (PI: Keyes)  
T32 MH013043  
Role on project: Principal investigator and director  
Dates of funding: 7/1/1972-6/30/2022  
Funder: National Institute of Mental Health  
Total annual direct and indirect costs: \$403,961

“Suicide as a contagion: modeling and forecasting emergent outbreaks” (PIs: Keyes and Shaman)  
R01 MH 121410  
Role on project: Co-principal Investigator and contact PI (multiple PI with Jeff Shaman)  
Dates of funding: 01/24/2020-11/30/2024  
Funder: National Institute of Mental Health  
Total annual direct and indirect costs: \$665,349.00

“As adolescent substance use declines, internalizing symptoms increase: identifying high-risk substance using groups and the role of social media, parental supervision, and unsupervised time” (PI: Keyes)  
R01-DA048853  
Role on project: Principal investigator  
Dates of funding: 07/01/2019-06/30/2024  
Funder: National Institute of Drug  
Total annual direct and indirect costs: \$434,794

“Age, period, and cohort effects on gender differences in alcohol use and alcohol-related problems in 47 national, longitudinally-followed cohorts” (PIs: Keyes and Jager)  
R01-AA026861  
Role on project: Co-principal investigator and contact PI (Multiple PI with Justin Jager)  
Dates of funding: 07/01/2018-06/30/2023  
Funder: National Institute of Alcohol Abuse and Alcoholism  
Total annual direct and indirect costs: \$529,899

“Diverging trends between depression/suicidality and alcohol/opioid use among adolescents in the United States: Subgroup variation and the role of social media in 2 samples of adolescents” (PI: Keyes)  
R49 CE002096, subproject of CDC injury center resubmission  
Role on project: Principal investigator  
Dates of funding: 07/01/2019-06/30/2021  
Funder: Centers for Disease Control and Prevention  
Total direct and indirect costs: \$200,000

“CHASE: an innovative county-level public health response to the opioid epidemic in New York State” (PIs: El-Bassel, Feaster, Gilbert, Nunes)  
UM1 DA049415  
Role on project: Co-Investigator

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Dates of funding: 04/17/2019-03/31/2023

Funder: National institute on Drug Abuse

Total direct and indirect costs: \$22,510,844

**“Columbia Injury Control Research Center” (PI: Branas)**

R49 CE002096

Role on project: Research Director

Dates of funding: 08/01/2019-07/31/2023

Funder: Centers for Disease Control and Prevention

**“Impact of medical and recreational marijuana laws on cannabis, opioids, and psychiatric medications: national study of VA patients, 2000-2024” (PI: Hasin)**

Role on project: Co-Investigator

Dates of funding: July 2019 – April 2024

Funder: National Institute on Drug Abuse (R01-DA048860)

Total direct and indirect costs: \$611,811

**“Examining the synergistic effects of cannabis and prescription opioid policies on chronic pain, opioid prescribing, and opioid overdose” (PI: Martins and Cerdá)**

Role on project: Co-Investigator

Dates of funding: January 2019 – November 2023

Funder: National Institute on Drug Abuse (R01-DA045872)

Total direct and indirect costs: \$730,223

**“Drug use among nightclub and dance festival attendees in New York City” (PI: Palamar)**

Role on project: Co-Investigator, PI of Columbia subcontract

Dates of funding: 09/01/2018-05/31/2021

Funder: National Institute on Drug Abuse (R01-DA044207)

Total direct and indirect costs: \$497,339

**“Monitoring the Future: Drug Use and Lifestyles of American Youth” (PI: Miech)**

Role on project: Co-Investigator, PI of Columbia subcontract

Dates of funding: August 2017 – June 2022

Funder: National Institute on Drug Abuse (R01 DA001411)

Direct costs: \$5,123,733

**PAST SUPPORT**

**“Is social media affecting adolescent mental health? Piloting machine learning techniques to identify at-risk youth in national samples of adolescents from 2009 through 2018.”**

Role on the project: Principal Investigator

Funder: Columbia Population Research Center

Dates: May 2019-May 2020

Total direct costs: \$15,000

Exh. A-8

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1688. TRUM004687443

1689. TRUM004698410

1690. TRUM004698417

1691. TRUM004707667

1692. TRUM004707668

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1718. TRUM004707725

Exh. B-76

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1657. TRUM004610234  
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1684. TRUM004687360  
1685. TRUM004687437  
1686. TRUM004687440  
1687. TRUM004687441

**“Substance abuse history, mental health and firearm violence: from evidence to action” (PI: Keyes and Cerda)**  
Role on project: Principal investigator and Contact PI (Multiple PI with Magdalena Cerda)  
Dates of funding: June 2015 – May 2019  
Funder: National Institute of Alcohol Abuse and Alcoholism (R21 DA041154)  
Direct costs: \$275,000

**“Race, alcohol consumption, and vehicle crashes: an epidemiologic paradox” (PI: Keyes)**  
Role on project: Principal investigator  
Dates of funding: June 2013 – May 2019  
Funder: National Institute of Alcohol Abuse and Alcoholism (K01AA021511)  
Direct costs: \$849,849

**“Aging well with alcohol? Harnessing longitudinal data from 20 countries to understand health impacts of moderate drinking among older adults” (PI: Keyes)**  
Role on project: Principal investigator  
Dates of funding: June 2017 – May 2019  
Funder: The Robert N. Butler Columbia Aging Center  
Direct costs: \$30,000

**“State medical marijuana laws and NSDUH marijuana use and consequences since 2004” (PI: Martins)**  
Role on project: Co-Investigator  
Dates of funding: August 2013 – December 2018  
Funder: National Institute on Drug Abuse (R01 DA037866)  
Direct costs: \$ 750,000

**“State medical marijuana laws and teen marijuana use and attitudes since 1991” (PI: Hasin)**  
Role on project: Co-Investigator, PI of Columbia subcontract  
Dates of funding: August 2012 – July 2017  
Funder: National Institute on Drug Abuse (R01 DA034244)  
Direct costs: \$ 374,562

**“Neighborhood interventions in alcohol-related homicide: a systems approach” (MPI: Keyes and Cerda)**  
Role on project: Principal investigator and Contact PI (Multiple PI with Magdalena Cerda)  
Dates of funding: October 2013-September 2016  
Funder: National Institute of Alcohol Abuse and Alcoholism (R21 AA021909)  
Direct costs: \$275,000

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**“Racial/Ethnic Disparity in Alcohol-Attributable Mortality from Motor Vehicle Crashes”**

Role on project: Principal investigator (PI)

Dates of funding: January 2016 – December 2016

Funder: Columbia University Center for Injury Epidemiology and Prevention

Direct costs: \$10,000

**“Correcting nonresponse bias in national surveys”**

Role on project: Principal investigator

Dates of funding: November 2015-October 2016

Funder: Columbia University Calderone Junior Faculty Prize

Direct costs: \$25,000

**“Principles of Epidemiology: a flipped classroom proposal”**

Role on the project: Principal Investigator (Multiple PI with Silvia Martins)

Dates of funding: May 2015 to May 2016

Funder: Columbia University Provost Hybrid Learning Course Redesign and Delivery program

Direct costs: \$12,000

**“Mental health and firearm violence: from evidence to action (MPI: Keyes and Cerdá)**

Role on project: Principal investigator (Multiple PI with Magdalena Cerdá)

Dates of funding: January 2015 – December 2015

Funder: Columbia University Center for Injury Epidemiology and Prevention

Direct costs: \$10,000

**“Developing a translational framework for studying grief and grief-related pathologies”**

Role on the project: Co-Investigator (PI: Zoe Donaldson)

Dates of funding: May 2015 – September 2015

Funder: Columbia University Collaborative and Multidisciplinary Pilot Research Awards

Direct costs: \$15,000

**“Does structural discrimination explain health disparities by race? Preliminary analyses in state-to-state mobility” (PI: Keyes)**

Role on project: Principal investigator

Dates of funding: December 2012 – June 2013

Funder: Robert Wood Johnson Health & Society Scholars Program at Columbia University

Direct costs: \$5,000.00

**Research Associate Award: “The longitudinal emergence of racial/ethnic differences in alcohol use disorders and depression from adolescence to adulthood” (PI: Keyes)**

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1626. TRUM004593846

1627. TRUM004594955

1628. TRUM004595047

1629. TRUM004595049

1630. TRUM004595073

1631. TRUM004595421

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1656. TRUM004608700

Exh. A-10

Exh. B-74

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1595. TRUM003646878  
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1609. TRUM004589936  
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1621. TRUM004592725  
1622. TRUM004592729  
1623. TRUM004592755  
1624. TRUM004593809  
1625. TRUM004593810

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Role on project: Principal Investigator  
Dates of funding: September 2011 – June 2012  
Funder: Columbia University  
Direct costs: \$30,000.00

**“Period and cohort effects in adolescent substance use: testing the effects of the social environment in a time series of U.S. adolescents from 1976-2008” (PI: Keyes)**  
Role on project: Principal Investigator  
Dates of funding: December 2010 – June 2011  
Funder: Robert Wood Johnson Health & Society Scholars Program at Columbia University  
Direct costs: \$10,000.00

**“Age-period-cohort effects on substance use in adolescence, 1976-2006” (PI: Keyes)**  
Role on project: Principal Investigator  
Dates of funding: June 2009 – October 2011 (electively terminated June 2010 due to early graduation)  
Funder: National Institute on Drug Abuse (F31 DA026689-01)

**Educational Contributions**

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**DIRECT TEACHING/PRECEPTING/SUPERVISING**

**Current courses**

- EPID P8410: Psychiatric Epidemiology, 2016-2020
- EPIC Summer Institute: Principles of Epidemiology, 2014-2020

**Former courses:**

*Role: Instructor*

- EPID 787: Multi-level analysis for public health research, 2015-2020 (University of Michigan Graduate Summer Session in Epidemiology)
- EPIC Summer Institute: Multi-level analysis for public health research, 2016-2019
- HPMN P8545: Analysis of Large-Scale Data, 2016-2019
- Special short course: Multi-level analysis for public health research, 2017, (University of Cape Town, Cape Town, South Africa)
- EPID P6400: Principles of Epidemiology, 2010- 2015
- EPIC Summer Institute: Analysis of Complex Survey Data, 2011-2013
- MSPH Core: Quantitative Foundations of Public Health, 2012

*Role: Assistant Course Director*

- EPID P6400: Principles of Epidemiology, 2008, 2009

*Role: Guest lecturer*

- Health as a System, Columbia University School of Engineering and Applied Sciences, 2020

Exh. B-73

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- K Award Seminar Series, New York State Psychiatric Institute, 2013-2020
- EPID P9489: Advanced Techniques in Epidemiological Methods, 2017
- MPH Core Module 202-206: Principles of Epidemiology, (École des hautes études en santé publique, Paris, France), 2011-2016
- EPID P8416: Selected Problems in Measurement, 2010-2016
- EPID P8438: Design and Conduct of Observational Epidemiology, 2012-2015
- EPID P8419: Reading Seminar in Psychiatric Epidemiology, 2009-2015
- EPID P8470: Epidemiology of Alcohol and Drug Problems, 2011-2015
- EPID P9419: Master's Essay in Epidemiology, 2008-2015
- EPID P8471: Social Epidemiology, 2010

*Role: Teaching assistant*

- EPID P6400: Principles of Epidemiology, 2006-2008
- EPID P8421: Introduction to Clinical Psychiatry for Public Health, 2006
- EPID P8471: Social Epidemiology, 2008
- EPID P8419: Reading Seminar in Psychiatric Epidemiology, 2009
- EPID P8470: Epidemiology of Alcohol and Drug Problems, 2010

## ADVISING AND MENTORSHIP

## Master's students:

Mary Elizabeth Smith, 2011 (thesis, second reader)  
 Pedro Carneiro, 2012 (thesis, second reader)  
 Bryan Kutner, 2012 (thesis, second reader)  
 Erin Gilbert, 2012 (thesis, second reader)  
 Xinfan Liu, 2012 (thesis, second reader)  
 Charissa Pratt, 2013 (thesis, first reader)  
 Arti Virkud, 2013 (thesis, first reader)  
 Jonathan Platt, 2013 (thesis, first reader)  
 Edward Gastel, 2013 (thesis, first reader)  
 Nathalie DuRivage, 2013 (thesis, first reader)  
 Thomas Vo, 2014 (thesis, first reader)  
 Mark Morgan, 2014 (thesis, first reader)  
 Sabrina Cheng, 2014 (thesis, first reader)  
 Stephanie Brazis, 2014 (thesis, first reader)  
 Ruth Chang, 2014 (thesis, first reader)  
 Amy Lanza, 2015 (thesis, first reader)  
 David Sowa, 2015 (thesis, first reader)  
 Chidinma Egbukichi, 2015 (thesis, first reader)  
 Khudejha Asghar, 2015 (thesis, first reader)  
 Dahsan Gary, 2016 (thesis, first reader)  
 Joy Ukaigwe, 2016 (thesis, first reader)  
 Elizabeth Wartella, 2016 (thesis, first reader)  
 Rachel Webster, 2016 (thesis, first reader)  
 Caroline Hugh, 2017 (thesis, first reader)  
 Ghadah Gadi, 2017 (thesis, first reader)  
 Margaret Havunjian, 2018 (thesis, first reader)

Exh. A-12

*Keyes Report*

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Exh. B-72

*Keyes Report*

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*Keyes Report*

Miriam Woodward, 2018 (thesis, first reader)  
Ian Rodgers, 2018 (thesis, first reader)  
Tatini Mal-Sarkar, expected 2019 (thesis, first reader)  
\* Sidney Kark Award for Excellence in Global Epidemiology  
Noah Kreski, 2019 (thesis, first reader)  
Mia Pandit, 2019 (thesis, first reader)  
Catherine Gimbrone, 2019 (thesis, first reader)  
\* Abstract selected for oral presentation on Epi Masters Student Day  
Alicia Singham Goodwin, 2020 (thesis, first reader)  
Pallavi Krishnamurthy, 2020 (thesis, first reader)

Doctoral students (former):

Joanne Brady, 2013-2014 (dissertation, second reader)  
• Currently: senior research fellow, NORC at the University of Chicago  
Melissa Dupont-Reyes, 2015-2017 (dissertation, second reader)  
• Currently: Assistant Professor, University of Texas at Austin  
Nina Banerjee, 2014-present (dissertation, second reader)  
• Currently: psychologist in private practice, Orange County, CA  
Julian Santaella, 2015-2018 (dissertation, sponsor)  
• Currently: faculty, Universidad del Valle, Colombia  
\*Awarded the William Farr Award for Social Epidemiology for dissertation work, 2019  
Jonathan Platt, 2015-2019 (dissertation, sponsor)  
• Currently: post-doctoral scholar, Department of Epidemiology, Columbia University  
\*Awarded the William Farr Award for Social Epidemiology for dissertation work, 2019  
Eleanor Hayes-Larson, 2018-2019  
• Currently: post-doctoral scholar, Department of Epidemiology, University of California Los Angeles  
\* Awarded the Anna C. Gelman Award for Excellence in Epidemiology for dissertation work, 2019  
Somjen Frazer, 2015-2019  
Currently: President and principal consultant, Strength in Numbers Consulting Group  
Paula Bordelois, 2015-2019  
Aravind Pillai, 2016-2020  
Currently: Epidemiology, Kentucky Department of Public Health  
Greg Cohen, 2018-present (dissertation, chair)  
Currently: Post-doctoral research fellow, Boston University  
Victor Puac-Polanco, 2018-present (dissertation, chair)  
Currently: Post-doctoral research fellow, Harvard University  
David Fink, 2015-present (dissertation, second reader)  
Currently: Post-doctoral research fellow, Columbia University  
Jonathan Pamplin, 2018-present (dissertation, chair)  
Currently: Post-doctoral research fellow, New York University

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*Keyes Report*

## Doctoral students (present):

Andrew Ratanatharathorn, 2018-present (dissertation, second reader)  
 Precious Esie, 2020-present (dissertation, second reader)  
 Alex Perlmutter, 2020-present (dissertation, second reader)  
 Sandhya Kajeepeeta, 2021-present (dissertation, second reader)  
 Sarah McKetta, 2019-present (dissertation, sponsor)  
 Deborah Huang, 2019-present (dissertation, sponsor)  
 Michelle Nolan, 2019-present (dissertation, sponsor)  
 Alexandra Restrepo Henao, 2019-present (dissertation, sponsor)  
 Shadiya Moss, 2019-present (dissertation, sponsor)  
 Melanie Askari, 2020-present (dissertation, sponsor)  
 Gonzalo Martinez-Ales, 2020-present (dissertation, chair)

## Discussant for dissertation proposal defense:

Wendy Cheng, 2014  
 Kate Sapra, 2014  
 Emily Greene, 2016  
 Anton Palma, 2019  
 Adriana Maldonado, 2019  
 Byoungjun Kim, 2021

## EDUCATIONAL ADMINISTRATION AND LEADERSHIP

- Director, Psychiatric Epidemiology Training Program, 2020-present
  - Directly responsible for administration of NIMH-funded T32 training program, which provides funding and training for four pre-doctoral students and three post-doctoral students. Provided advising to students, administration of program structure and content, coordination with co-directors on weekly seminar and field placements for students.
- Director, Executive MS in Epidemiology Program, 2012-2015
  - Directly responsible for administration of the program, including designing the coursework and program, overseeing instructors, overseeing admissions process, advising students. Contact hours were 10 hours per week.

## TRAINING PROGRAM INVOLVEMENT

- T32 MH013043-45 “A Research Training Program in Psychiatric Epidemiology”  
 Role: Director (with Ezra Susser, Bruce Dohrenwend, and Sharon Schwartz)
- T32 DA-031099-05 “Epidemiology of Substance Use Disorders Training Program at Columbia University” (PI: Hasin)  
 Role: Faculty, Steering Committee
- T32 ES023772-02 “Training Program in Environmental Life Course Epidemiology” (PI: Factor-Litvak)

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*Keyes Report*

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*Keyes Report*

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 1501. SUFFOLK02723463

Exh. B-69

*Keyes Report*

Role: Faculty

**Publications**

PEER-REVIEWED RESEARCH PUBLICATIONS IN PRINT OR OTHER MEDIA

+ mentee

\* senior author

1. +Martinez-Alex G, +Pamplin JR, +Rutherford C, +Gimbrone C, Kandula S, Olfson M, Gould MS, Shaman J, **\*Keyes KM**. 2021. Age, period, and cohort effects on suicide death in the United States from 2009 to 2018: moderation by sex, race, and firearm involvement. *Molecular Psychiatry*, ePub April 7. PMID: 33828236.
2. +Pillai A, **Keyes KM**, Susser E. 2021. Antidepressant prescriptions and adherence in primary care in India: Insights from a cluster randomized control trial. *PLoS One*, March 19;16(3). PMID: 33739982.
3. **Keyes KM**, Kandula S, Olfson M, Gould MS, +Martinez-Ales G, +Rutherford C, Shaman J. 2021. Suicide and the agent-host-environment triad: leveraging surveillance sources to inform prevention. *Psychological Medicine*, ePub March 5. PMID: 33663629.
4. +Kajeepeta S, Mauro PM, **Keyes KM**, El-Sayed AM, Rutherford CG, Prins SJ. 2021. Association between county jail incarceration and cause-specific county mortality in the USA, 1987-2017: a retrospective, longitudinal study. *Lancet Public Health*, ePub February 23. PMID: 33636104.
5. Adams RS, +Jiang T, Rosellini AJ, Horvath-Puho E, Street AE, **Keyes KM**, Cerdá M, Lash TL, Sorensen HT, Gradus JL. 2021. Sex-specific risk profiles for suicide among persons with substance use disorders in Denmark. *Addiction*, ePub Feb 23. PMID: 33620758.
6. Palamar JJ, Fitzgerald ND, **Keyes KM**, Cottler LB. 2021. Drug checking at dance festivals: A review with recommendations to increase generalizability of findings. *Experimental and Clinical Psychopharmacology*, ePub Feb 18. PMID: 33600199.
7. +McKetta S, Morrison C, **\*Keyes KM**. 2021. Trends in US Alcohol Consumption Frequency during the First Wave of the SARS-CoV-2 Pandemic. *Alcoholism: Clinical and Experimental Research*, ePub Feb 15. PMID: 33587290.
8. Beaulieu E, DiGennaro C, Stringfellow E, Connolly A, Hamilton A, Hyder A, Cerdá M, Keyes KM, Jalai MS. 2021. Economic evaluation in opioid modeling: systematic review. *Feb;24(12):158-173*. PMID: 33518022.
9. +Chan CS, Sarvet SL, Basu A, Koenen K, **\*Keyes KM**. 2021. Associations of intimate partner violence and financial adversity with familial homelessness in pregnant and postpartum women: A 7-year prospective study of the ALSPAC cohort. *PLoS One*, Jan 15;16(1). PMID: 33449965.
10. Jager J, **\*Keyes KM**. 2021. Is substance use changing because of the COVID-19 pandemic? Conceptual and methodological considerations to delineating the impact of the Covid-19 pandemic on substance use and disorder. *Addiction*, ePub Jan 15. PMID: 33449443.

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*Keyes Report*

11. +Platt JM, Bates L, Jager J, McLaughlin KA, **\*Keyes KM**. 2021. Is the US Gender Gap in Depression Changing Over Time? A Meta-Regression. *American Journal of Epidemiology*, ePub Jan 11. PMID: 33423055.
12. +Puac-Polanco V, **Keyes KM**, Mauro PM, Branas CC. 2020. A systematic review of drink specials, drink special laws, and alcohol-related outcomes. *Current Epidemiology Reports*, 7(4):300-314. PMID: 33364145.
13. Linas BP, Savinkina A, Barbosa C, Mueller PP, Cerdá M, **Keyes KM**, Chhatwal J. 2021. A clash of epidemics: impact of COVID-19 pandemic response on opioid overdose. *Journal of Substance Abuse Treatment*, ePub Jan;120:108158. PMID: 33298298.
14. +Shimonovich M, Pearce A, Thomson H, **Keyes KM**, Katikireddi SV. 2020. Assessing causality in epidemiology: revisiting Bradford Hill to incorporate developments in causal thinking. *European Journal of Epidemiology*, ePub December 16. PMID: 33324996.
15. +Grummitt LR, Kelly EV, Barrett EL, **Keyes KM**, Newton NC. 2020. Identifying targets for substance use prevention in youth people exposed to childhood adversity: protocol for a systematic review. *JMIR Research Protocols*. Dec 4;9(12):e22368. PMID: 33275102.
16. Cerdá M, Krawczyk N, Hamilton L, Rudolph KE, Friedman SR, **\*Keyes KM**. 2020. A Critical Review of the Social and Behavioral Contributions to the Overdose Epidemic. *Annual Review of Public Health*, Nov 30. PMID: 33256535.
17. Prins SJ, +McKetta S, +Platt J, Muntaner C, **Keyes KM**, Bates LM. 2020. "The Serpent of their Agonies": Exploitation As Structural Determinant of Mental Illness. *Epidemiology*, Nov 25<sup>th</sup>. PMID: 33252438.
18. HEALing Communities Study Consortium. 2020. The HEALing (Helping to End Addiction Long-term) Communities Study: Protocol for a cluster randomized trial at the community level to reduce opioid overdose deaths through implementation of an integrated set of evidence-based practices. *Drug and Alcohol Dependence*, ePub Oct 17. PMID: 33248391.
19. Calvo E, Allel K, Staudinger UM, Castillo-Carniglia A, Medina JT, **\*Keyes KM**. 2020. Cross-country differences in age trends in alcohol consumption among older adults: a cross-sectional study of individuals aged 50 years and older in 22 countries. *Addiction*, ePub Nov 25. PMID: 33241648.
20. Abdalla SM, **Keyes KM**, Galea S. 2020. A public health approach to tackling the role of culture in shaping the gun violence epidemic in the United States. *Public Health Reports*, ePub October 27. PMID: 33130532.
21. +Kaur N, **Keyes KM**, +Hamilton AD, Chapman C, Livingston M, Slade T, Swift W. 2020. Trends in cannabis use and attitudes toward legalization and use among Australians from 2001-2016: an age-period-cohort analysis. *Addiction*, ePub Sep 19. PMID: 32949418.
22. Zafari Z, **Keyes KM**, Jiao B, Williams SZ, Muenning PA. 2020. Differences between black and whites in well-being, beliefs, emotional states, behaviors, and survival: 1978-2014. *PLoS One*, Sept 14:15(9). PMID: 32925952.
23. Masfety VK, +Woodward MJ, **Keyes KM**, Bitofi A, Carta MG, Koc C, Lesinskiene S, Mihova Z, Otten R, Husky M. 2020. Gender, the gender gap, and their interaction: analysis of relationships with children's mental health problems.

Exh. A-16

*Keyes Report*

1440. SUFFOLK02723341
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Exh. B-68

*Keyes Report*

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 1439. SUFFOLK02723339

Exh. B-67

*Keyes Report*

Social Psychiatry and Psychiatric Epidemiology, ePub September 10. PMID: 32914299.  
 24. Meinhofer A, Onuoha E, Anglero-Diaz Y, \*Keyes KM. 2020. Parental drug use and racial and ethnic disproportionality in the U.S. foster care system. *Child Youth Serv Rev*. Nov;118:105336. PMID: 32863501.  
 25. +Martinez-Ales G, Hernandez-Calle D, Hauli N, \*Keyes KM. 2020. Why Are Suicide Rates Increasing in the United States? Towards a Multilevel Reimagination of Suicide Prevention. *Curr Top Behav Neurosci*, ePub Aug 30. PMID: 32860592.  
 26. +Kreski N, +Platt J, +Rutherford C, Olfson M, Odgers C, Schulenberg J, \*Keyes KM. 2020. Social media use and depressive symptoms among United States adolescents. *Journal of Adolescent Health*, ePub Aug 11. PMID: 32798102.  
 27. Calvo E, Medina JT, Ornstein KA, Staudinger UM, Fried LP, \*Keyes KM. 2020. Cross-country and historical variation in alcohol consumption among older men and women: leveraging recently harmonized survey data in 21 countries. *Drug and Alcohol Dependence*, ePub Aug 4. PMID: 32795884.  
 28. +Richardson RA, Keyes KM, Medina JT, Calvo E. 2020. Sociodemographic inequalities in depression among older adults: cross-sectional evidence from 18 countries. *Lancet Psychiatry*, 7(8):673-681. PMID: 32711708.  
 29. Keyes KM, Jager J, +Platt J, +Rutherford C, Patrick ME, Kloska DD, Schulenberg J. 2020. When does attrition lead to biased estimates of alcohol consumption? Bias analysis for loss to follow-up in 30 longitudinal cohorts. *International Journal of Methods in Psychiatric Research*, ePub July 13<sup>th</sup>. PMID: 32656917.  
 30. +Santaella-Tenorio J, Martins SS, Cerdá M, Olfson M, \*Keyes KM. 2020. Suicidal ideation and attempts following nonmedical use of prescription opioids and related disorder. *Psychological Medicine*, ePub July 8. PMID: 32635959.  
 31. +Kaur N, +Rutherford CG, Martins SS, \*Keyes KM. 2020. Associations between digital technology and substance use among US adolescents: Results from the 2018 Monitoring the Future survey. *Drug and Alcohol Dependence*, ePub Jun 18. PMID: 32590211.  
 32. +Santaella-Tenorio J, Wheeler-Martin K, DiMaggio CJ, Castillo-Carniglia A, Keyes KM, Hasin D, Cerdá M. 2020. Association of Recreational Cannabis Laws in Colorado and Washington State With Changes in Traffic Fatalities, 2005-2017. *JAMA Internal Medicine*, ePub June 22. PMID: 32568378.  
 33. +Platt JM, Bates LM, Jager J, McLaughlin KA, \*Keyes KM. 2020. Changes in the depression gender gap from 1992 to 2014: Cohort effects and mediation by gendered social position. *Social Science and Medicine*, ePub May 30. PMID: 32540513.  
 34. Palamar JJ, Han BH, \*Keyes KM. 2020. Trends in characteristics of individuals who use methamphetamine in the United States, 2015-2018. *Drug and Alcohol Dependence*, ePub June 3. PMID: 32531703.  
 35. Castillo-Carniglia A, Rivera-Aguirre A, Calvo E, Queirolo R, Keyes KM, Cerdá M. 2020. Trends in marijuana use in two Latin American countries: an age, period, and cohort study. *Addiction*, ePub March 20. PMID 32196789.

Exh. A-17

*Keyes Report*

36. Puac-Polanco V, Chihuri S, Fink DS, Cerdá M, **Keyes KM**, Li G. 2020. Prescription Drug Monitoring Programs and Prescription Opioid-Related Outcomes in the United States. *Epidemiology Reviews*, ePub April 3. PMID: 32242239.

37. Morrison CN, Mehranbod C, Kzwizera M, Rundle AG, **Keyes KM**, Humphreys DK. 2020. Ridesharing and motor vehicle crashes: a spatial ecological case-crossover study of trip-level data. *Injury Prevention*, ePub Apr 6. PMID: 32253258.

38. Margolis AE, Broitman J, Davis JM, Alexander L, Hamilton A, Liao Z, Bunker S, Thomas L, Rampthal B, Salum GA, Merikangas K, Goldsmith J, Paus T, **Keyes KM**, Milham MP. 2020. Estimated Prevalence of Nonverbal Learning Disability Among North American Children and Adolescents. *JAMA Netw Open*, ePub Apr 1. PMID: 32275324.

39. +McKetta SC, \*Keyes KM. 2020. Trends in U.S. women's binge drinking in middle adulthood by socioeconomic status, 2006-2018. *Drug and Alcohol Dependence*, ePub Apr 28. PMID: 32408139.

40. Palamar JJ, \*Keyes KM. 2020. Trends in drug use among electronic dance music party attendees in New York City, 2016-2019. *Drug and Alcohol Dependence*, ePub Feb 5<sup>th</sup>. PMID: 32050110.

41. Lau B, Duggal P, Ehrhardt S, Armenian H, Branas CC, Colditz GA, Fox MP, Hawes SE, He J, Hofman A, **Keyes KM**, Ko AI, Lash TL, Levy D, Lu M, Morabia A, Ness R, Nieto FJ, Schisterman EF, Strumer T, Szklo M, Werler M, Wilcox AJ, Celentano DD. 2020. Perspectives on the Future of Epidemiology: a Framework for Training. *American Journal of Epidemiology*, ePub Jan 31. PMID: 32003778.

42. Palamar JJ, Salomone A, +Rutherford C, \*Keyes KM. 2020. Extensive Underreported Exposure to Ketamine Among Electronic Dance Music Party Attendees. *J Gen Intern Medicine*, ePub Jan 29. PMID: 31997140.

43. +Kajeepta S, +Rutherford CG, **Keyes KM**, El-Sayed AM, Prins SJ. 2020. County Jail Incarceration Rates and County Mortality Rates in the United States, 1987-2016. *American Journal of Public Health*, Jan110(S1):S109-S115. PMID: 31967885.

44. Hasin DS, Shmulewitz D, Cerdá M, **Keyes KM**, Olfson M, Sarvet AL, Wall MM. 2020. U.S. Adults With Pain, A Group Increasingly Vulnerable to Nonmedical Cannabis Use and Cannabis Use Disorder: 2001-2002 and 2012-2013. *American Journal of Psychiatry*, ePub Jan 22. PMID: 31964162.

45. Miech R, **Keyes KM**, O'Malley PM, Johnston LD. 2020. The great decline in adolescent cigarette smoking since 2000: consequences for drug use among US adolescents. *Tobacco Control*, ePub Jan 15. PMID 31941823.

46. +Platt JM, **Keyes KM**, McLaughlin KA, Kaufman AS. 2019. The Flynn effect for fluid IQ may not generalize to all ages or ability levels: a population-based study of 10,000 US adolescents. *Intelligence*, Vol 77. PMID: 32322129.

47. Kagawa R, Pear VA, Rudolph KE, **Keyes KM**, Cerdá M, Wintemute GJ. 2019. Distress level and daily functioning problems attributed to firearm victimization: Sociodemographic specific responses. *Annals of Epidemiology*. ePub Dec 6. PMID: TBD.

Exh. A-18

*Keyes Report*

1378. SUFFOLK02723219

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Exh. B-66

*Keyes Report*

1347. SUFFOLK02723067  
 1348. SUFFOLK02723087  
 1349. SUFFOLK02723107  
 1350. SUFFOLK02723117  
 1351. SUFFOLK02723147  
 1352. SUFFOLK02723187  
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 1368. SUFFOLK02723204  
 1369. SUFFOLK02723205  
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 1373. SUFFOLK02723209  
 1374. SUFFOLK02723211  
 1375. SUFFOLK02723213  
 1376. SUFFOLK02723215  
 1377. SUFFOLK02723217

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1317. SUFFOLK02722425
1318. SUFFOLK02722438
1319. SUFFOLK02722450
1320. SUFFOLK02722463
1321. SUFFOLK02722476
1322. SUFFOLK02722489
1323. SUFFOLK02722514
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1325. SUFFOLK02722557
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1328. SUFFOLK02722617
1329. SUFFOLK02722638
1330. SUFFOLK02722660
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1340. SUFFOLK02722902
1341. SUFFOLK02722928
1342. SUFFOLK02722954
1343. SUFFOLK02722981
1344. SUFFOLK02723005
1345. SUFFOLK02723027
1346. SUFFOLK02723047

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*Keyes Report*

1285. SUFFOLK01988775  
 1286. SUFFOLK02099919  
 1287. SUFFOLK02099974  
 1288. SUFFOLK02099975  
 1289. SUFFOLK02099976  
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 1293. SUFFOLK02099989  
 1294. SUFFOLK02099991  
 1295. SUFFOLK02099993  
 1296. SUFFOLK02099994  
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 1313. SUFFOLK02722374  
 1314. SUFFOLK02722383  
 1315. SUFFOLK02722397

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1254. SUFFOLK00881516

1255. SUFFOLK00883926

1256. SUFFOLK00887154

1257. SUFFOLK00891052

1258. SUFFOLK00895094

1259. SUFFOLK00900172

1260. SUFFOLK00907094

1261. SUFFOLK00913086

1262. SUFFOLK00918216

1263. SUFFOLK00923682

1264. SUFFOLK00928054

1265. SUFFOLK00932280

1266. SUFFOLK01186082

1267. SUFFOLK01195432

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1269. SUFFOLK01404761

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1277. SUFFOLK01404878

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1279. SUFFOLK01404882

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1281. SUFFOLK01404888

1282. SUFFOLK01404925

1283. SUFFOLK01563032

1284. SUFFOLK01928414

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1223. SUFFOLK00347876  
 1224. SUFFOLK00347908  
 1225. SUFFOLK00347909  
 1226. SUFFOLK00348423  
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 1253. SUFFOLK00879600

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1193. NYAG02017451

1194. NYAG02017589

1195. NYAG02017728

1196. NYAG02017865

1197. NYAG02018003

1198. NYAG02018142

1199. NYAG02018280

1200. NYAG02018419

1201. NYAG02018420

1202. NYAG02018421

1203. NYAG02018486

1204. NYAG02018613

1205. NYAG02018759

1206. SUFFOLK00297211

1207. SUFFOLK00297324

1208. SUFFOLK00297360

1209. SUFFOLK00298252

1210. SUFFOLK00299071

1211. SUFFOLK00307374

1212. SUFFOLK00311750

1213. SUFFOLK00312401

1214. SUFFOLK00313621

1215. SUFFOLK00313622

1216. SUFFOLK00315437

1217. SUFFOLK00347633

1218. SUFFOLK00347639

1219. SUFFOLK00347726

1220. SUFFOLK00347837

1221. SUFFOLK00347842

1222. SUFFOLK00347871

Exh. B-60

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1161. NYAG02016806  
 1162. NYAG02016808  
 1163. NYAG02016810  
 1164. NYAG02016812  
 1165. NYAG02016814  
 1166. NYAG02016816  
 1167. NYAG02016818  
 1168. NYAG02016820  
 1169. NYAG02016822  
 1170. NYAG02016829  
 1171. NYAG02016837  
 1172. NYAG02016845  
 1173. NYAG02016853  
 1174. NYAG02016861  
 1175. NYAG02016869  
 1176. NYAG02016877  
 1177. NYAG02016885  
 1178. NYAG02016893  
 1179. NYAG02016901  
 1180. NYAG02016958  
 1181. NYAG02017028  
 1182. NYAG02017029  
 1183. NYAG02017030  
 1184. NYAG02017031  
 1185. NYAG02017032  
 1186. NYAG02017033  
 1187. NYAG02017034  
 1188. NYAG02017035  
 1189. NYAG02017036  
 1190. NYAG02017037  
 1191. NYAG02017174

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1131. NYAG01578197

1132. NYAG02016718

1133. NYAG02016742

1134. NYAG02016746

1135. NYAG02016750

1136. NYAG02016754

1137. NYAG02016758

1138. NYAG02016760

1139. NYAG02016762

1140. NYAG02016764

1141. NYAG02016766

1142. NYAG02016768

1143. NYAG02016770

1144. NYAG02016772

1145. NYAG02016774

1146. NYAG02016776

1147. NYAG02016778

1148. NYAG02016780

1149. NYAG02016782

1150. NYAG02016784

1151. NYAG02016786

1152. NYAG02016788

1153. NYAG02016790

1154. NYAG02016792

1155. NYAG02016794

1156. NYAG02016796

1157. NYAG02016798

1158. NYAG02016800

1159. NYAG02016802

1160. NYAG02016804

Exh. A-26

Exh. B-58

*Keyes Report*

1099. MarshallHealth-00002242\_MH003  
 1100. MarshallHealth-00002243\_MH003  
 1101. MCKMDL00496309  
 1102. MCKMDL00557196  
 1103. Nassau\_00069863  
 1104. Nassau\_00070135  
 1105. Nassau\_00070515  
 1106. Nassau\_00070518  
 1107. Nassau\_00070685  
 1108. Nassau\_00075956  
 1109. Nassau\_00076517  
 1110. Nassau\_00078259  
 1111. Nassau\_00078260  
 1112. Nassau\_00078261  
 1113. Nassau\_00078262  
 1114. Nassau\_00078267  
 1115. Nassau\_00078268  
 1116. Nassau\_00078271  
 1117. Nassau\_00081513  
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 1120. Nassau\_00095791  
 1121. Nassau\_00471222  
 1122. Nassau\_00475195  
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 1124. NYAG00262889  
 1125. NYAG01526575  
 1126. NYAG01578189  
 1127. NYAG01578190  
 1128. NYAG01578191  
 1129. NYAG01578192

Exh. B-57

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1069. LAKE005138543

1070. LAKE005138548

1071. LAKE005143008

1072. LAKE005143009

1073. LAKE005143905

1074. LAKE005143909

1075. LAKE005143912

1076. LAKE005143914

1077. LAKE005314271

1078. LAKE005314276

1079. LAKE005314277

1080. LGRC\_MDL\_Internal\_00000012

1081. MarshallHealth\_00000001

1082. MarshallHealth-00002208

1083. MarshallHealth-00002209

1084. MarshallHealth-00002210f

1085. MarshallHealth-00002211

1086. MarshallHealth-00002212

1087. MarshallHealth-00002213

1088. MarshallHealth-00002214

1089. MarshallHealth-00002215

1090. MarshallHealth-00002216 f

1091. MarshallHealth-00002227\_MH003

1092. MarshallHealth-00002228\_MH003

1093. MarshallHealth-00002236\_MH003

1094. MarshallHealth-00002237\_MH003

1095. MarshallHealth-00002238\_MH003

1096. MarshallHealth-00002239\_MH003

1097. MarshallHealth-00002240\_MH003

1098. MarshallHealth-00002241\_MH003

Exh. B-56

*Keyes Report*

1037. LAKE003982012  
 1038. LAKE003982168  
 1039. LAKE003982674  
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 1041. LAKE003985309  
 1042. LAKE003986313  
 1043. LAKE003987010  
 1044. LAKE004004142  
 1045. LAKE004007290  
 1046. LAKE004007482  
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 1062. LAKE005137229  
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 1064. LAKE005137558  
 1065. LAKE005138490  
 1066. LAKE005138491  
 1067. LAKE005138541

Exh. B-55

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Exh. A-30

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1006. LAKE002357666

1007. LAKE002357674

1008. LAKE002358034

1009. LAKE002358235

1010. LAKE002358236

1011. LAKE002385636

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1013. LAKE002430424

1014. LAKE002430449

1015. LAKE002433132

1016. LAKE002433260

1017. LAKE002434349

1018. LAKE002434881

1019. LAKE002724728

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1027. LAKE002733813

1028. LAKE002733814

1029. LAKE002733890

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1031. LAKE002736803

1032. LAKE002819097

1033. LAKE002860097

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1035. LAKE003977670

1036. LAKE003980281

Exh. B-54

*Keyes Report*

975. LAKE002351784  
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 1002. LAKE002357524  
 1003. LAKE002357545  
 1004. LAKE002357631  
 1005. LAKE002357637

Exh. B-53

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944. LAKE000003685  
 945. LAKE000003686  
 946. LAKE000003687  
 947. LAKE000009107  
 948. LAKE000047019  
 949. LAKE000057535  
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 951. LAKE000065139  
 952. LAKE000082146  
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 973. LAKE002350330  
 974. LAKE002351098

Exh. A-32

Exh. B-52

*Keyes Report*

913. HUNT\_00061244  
 914. HUNT\_00061307  
 915. HUNT\_00061433  
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 942. LAKE000003673  
 943. LAKE000003679

Exh. B-51

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Exh. A-34

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882. CUYAH\_003505168

883. CUYAH\_013470168

884. CUYAH\_014207127

885. HUNT\_00009752

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892. HUNT\_00029477

893. HUNT\_00030062

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896. HUNT\_00030097

897. HUNT\_00030099

898. HUNT\_00030183

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901. HUNT\_00030366

902. HUNT\_00030411

903. HUNT\_00030412

904. HUNT\_00036558

905. HUNT\_00042695

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907. HUNT\_00047053

908. HUNT\_00047080

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911. HUNT\_00053206

912. HUNT\_00060305

Exh. B-50

## Keyes Report

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 869. CHHD\_0061559  
 870. CHHD\_0075557  
 871. CUYAH\_000010424  
 872. CUYAH\_000017387  
 873. CUYAH\_000018356  
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 878. CUYAH\_002351018  
 879. CUYAH\_002472581  
 880. CUYAH\_002486141  
 881. CUYAH\_003468436

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10. New Methods for an Old Epidemiologic Problem: Age, Period, and Cohort Effects. Society for Epidemiologic Research, Symposium chair, June 2013, Boston, MA.

11. Testing the 'Jackson hypothesis': are black/white differences in depression due to differential effects of stress and unhealthy behaviors? Symposium presentation, Psychiatric Epidemiology Faculty/Fellows Training Seminar, November 2010, New York, NY.

12. Adverse childhood events and the structure of common psychiatric disorders. Symposium presentation, Adverse Childhood Experiences, Personality Psychopathology, and Alcohol Disorders. May 2010, New York, NY.

13. The role of craving in future classifications of alcohol use disorders. Symposium presentation, Adverse Childhood Experiences, Personality Psychopathology, and Alcohol Disorders. December 2009, New York, NY.

14. 'Age Selection of Mortality from Tuberculosis': a re-analysis of Frost on the 70<sup>th</sup> anniversary of publication. Symposium presentation, American Public Health Association, November 2009, Philadelphia, PA.

15. Population-level disapproval and the prevalence of substance use: a multi-level age-period-cohort analysis of high-school attending adolescents in the United States, 1976-2008. Symposium presentation, Research Seminars in Epidemiology, October 2009, New York, NY.

16. Age-Period-Cohort estimation throughout history: tracing the meaning of a 'cohort effect' Symposium presentation. Psychiatric Epidemiology Faculty/Fellows Training Seminar. February 2009, New York, NY.

17. Influence of a drinking quantity and frequency measure on the prevalence and demographic correlates of DSM-IV alcohol use disorders. Symposium presentation, Research Society on Alcoholism, June 2008, Washington, DC.

18. Methodological Issues in the Estimation of Age-Period-Cohort Effects. Symposium presentation. Psychiatric Epidemiology Faculty/Fellows Training Seminar. March 2008, New York, NY.

19. Disentangling age-period-cohort effects: problems and possibilities. Symposium presentation, American Psychopathological Association. March 2008, New York, NY.

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*Keyes Report*

20. Time in the causal landscape: age, period, and cohort effects in alcohol and drug epidemiology. Symposium presentation, Psychiatric Epidemiology Faculty/Fellow Training Seminar, May 2007, New York, NY.
21. Birth cohort effects on gender differences in the risk for alcohol and drug dependence. Symposium presentation, Research Society on Alcoholism, June 2006, Baltimore, MD.
22. Gender differences in the risk for alcohol abuse and dependence: the effect of birth cohort. Symposium presentation, Psychiatric Epidemiology Faculty/Fellow Training Seminar, December 2005, New York, NY.
23. Cannabis withdrawal in 2,613 lifetime heavy cannabis users. Symposium presentation, Novel Phenotype Development for Genetics Studies of Substance Abuse Disorders, September 2005, New York, NY.

*NATIONAL*

1. Age, Period, and Cohort Effects on Substance Use and Mental Health in the 21<sup>st</sup> Century. Society for Epidemiologic Research, plenary talk, December 2020. Virtual.
2. The rapid decline in adolescent mental health in the 21st century: magnitude, causes, and treatment innovations from a life course perspective. Society for Epidemiologic Research, symposium chair, December 2020. Virtual.
3. The mental health of adolescents in the 21<sup>st</sup> century: time trends and how they inform etiology. Society for Epidemiologic Research, symposium presentation, December 2020. Virtual.
4. Suicide mortality in the United States: 1999 to 2019 and beyond. Society for Epidemiologic Research, symposium presentation, December 2020. Virtual.
5. Family matters: using family designs to control confounding in observational studies. Society for Epidemiologic Research, symposium chair, June 2019, Minneapolis, MN.
6. Simulating firearm suicide based on gun ownership disqualifications: an agent-based modeling approach. Association for Psychological Science, symposium presentation, May 2019, Washington, DC.
7. Rapid increases in depressive symptoms among US adolescents: 1991-2018. Society for the Advancement of Violence and Injury Research, symposium presentation, April 2019, Cincinnati, OH.
8. Declines in the relationship between adolescent depressive affect and binge drinking: implications for public mental health. Research Society on Alcoholism, symposium presentation, June 2018, San Diego, CA.
9. Psychiatric epidemiology in the era of precision medicine: what is our role? Symposium chair, Society for Epidemiologic Research, June 2017, Seattle, WA.
10. Fifty years of high impact epidemiological research on drug use disorders and related conditions: Looking back and ahead. Symposium presentation, Society for Epidemiologic Research, June 2017, Seattle, WA.
11. Agent-based model of alcohol taxation effects on violence and homicide in New York City. Symposium presentation, Research Society on Alcoholism, June 2016, New Orleans, LA.

Exh. A-46

*Keyes Report*

642. Robert K. Twillman, Rebecca Kirch, Aaron Gilson. Efforts to Control Prescription Drug Abuse: Why Clinicians Should Be Concerned and Take Action as Essential Advocates for Rational Policy. American Cancer Society, [cacancerjournal.com](http://cacancerjournal.com) VOLUME 64 NUMBER 6
643. Robert M. Calif, Janet Woodcock, and Stephen Ostroff. A Proactive Response to Prescription Opioid Abuse. *The New England Journal of Medicine* at NEJM.org.
644. Roger Chou, Jane C. Ballantyne, Gilbert J. Fanciullo, Perry G. Fine, and Christine Miaskowski. Research Gaps on Use of Opioids for Chronic Noncancer Pain: Findings From a Review of the Evidence for an American Pain Society and American Academy of Pain Medicine Clinical Practice Guideline. *The Journal of Pain*, Vol 10, No 2 : pp 147-159
645. Rose A. Rudd, Noah Aleshire, Jon E. Zibbell, R. Matthew Gladden. Increases in Drug and Opioid Overdose Deaths - United States, 2000-2014. *Morbidity and Mortality Weekly Report* - US Dept of Health and Human Services/CDC - Vol. 64 Nos. 50 & 51
646. Rose G. Sick individuals and sick populations. *Int J Epidemiol*. 2001;30(3):427- 432. doi:10.1093/ije/30.3.427
647. Roth, D. et al. Inclusion of Positive Self-reporting by Mothers of Substance Exposed Neonates Increases the Predictability of NAS Severity Over Toxicology Alone. *Maternal and Child Health Journal* (2020) 24:340–350
648. Rothman KJ, Greenland S, Lash TL. *Modern Epidemiology*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2008.
649. Rough Transcript of Deposition of Daniel Ciccarone, MD, MPH. City of Huntington, West Virginia et al. v. AmerisourceBergen Drug Corporation et al., Case No. 3:17-01362. September 8, 2020
650. Rough Transcript of Deposition of T. Davies 2020-07-28
651. Rowe C, Vittinghoff E, Santos G-M, Behar E, Turner C, Coffin PO. Performance Measures of Diagnostic Codes for Detecting Opioid Overdose in the Emergency Department. *Acad Emerg Med*. 2016;24(4):475-483. doi:10.1111/acem.13121
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653. Rudd RA, Seth P, David F, Scholl L. Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015. *Morb Mortal Wkly Rep*. 2016;65(50-51):1445– 1452. doi:<http://dx.doi.org/10.15585/mmwr.mm655051e1>
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*Keyes Report*

626. Radel L, Baldwin M, Crouse G, Ghertner R, Waters A. Substance Use, the Opioid Epidemic, and the Child Welfare System: Key Findings from a Mixed Methods Study. ASPE Research Brief. 2018.

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629. Raymond Carney Deposition Testimony Excerpts – MDL 2804, October 16, 2018

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631. Rebecca L. Haffajee and Michelle M. Mello. Drug Companies' Liability for the Opioid Epidemic. *The New England Journal of Medicine*

632. Rees DI, Sabia JJ, Argys LM, Latshaw J, Dave D. With a little help from my friends: the effects of naloxone access and good Samaritan laws on opioid-related deaths. *NBER Work Pap Ser.* 2017;No. 23171.

633. Registered Nurses in WV. <https://wvrmboard.wv.gov/Pages/default.aspx>

634. Results from the 2013 National Survey on Drug Use and Health: Detailed Tables. Substance Abuse and Mental Health Services Administration. <https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2013/NSDUH-DetTabs2013.htm#tab1.54a>.

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639. Richard Harruff and Julia Hood. Toward a Real-Time Drug Overdose Monitoring System. Public Health Seattle and King Counties (power point)

640. Richy F, Bruyere O, Ethgen O, et al. Time dependent risk of gastrointestinal complications induced by non-steroidal anti-inflammatory drug use: a consensus statement using a meta-analytic approach. *Ann Rheum Dis.* 2004;63(7):759-766. doi:10.1136/ard.2003.015925

641. Ritterband, V. 3-minute case study: When hugs are the best medicine. <https://www.athenahealth.com/insight/3-minute-case-study-when-hugs-are-best-medicine>

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*Keyes Report*

62. The impact of traumatic experiences across diverse populations: causes, consequences, and correlates. Symposium chair, Society for Epidemiologic Research, June 2016, Miami, FL.

13. Agent-Based models and the G-Formula: Comparable Approaches for Evaluating Population Intervention Effects? Symposium discussant, Society for Epidemiologic Research, June 2016, Miami, FL.

14. How similar are survey respondents to the general population? Symposium presentation, Society for Epidemiologic Research, June 2016, Miami, FL.

15. Mental Health and Aging: Chronic Disease, Cognition, and Pathways Connecting Mind and Body. Symposium chair, Society for Epidemiological Research, June 2015, Denver, CO.

16. Teaching epidemiology by building on foundational concepts. Symposium presentation, Society for Epidemiological Research, June 2015, Denver, CO.

17. The mathematical limits of genetic prediction for complex chronic disease. Symposium presentation, Society for Epidemiological Research, June 2015, Denver, CO.

18. Alcohol Interventions and Rates of Violence and Homicide in New York City: an Agent-Based Approach. Symposium presentation, Society for Epidemiological Research, June 2015, Denver, CO.

19. Racial/ethnic differences in alcohol use across the life course: an explanation of health disparities? International Epidemiological Association, August 2014, Anchorage, AL.

20. Health within and across generations: new research in life course epidemiology. Symposium chair, Society for Epidemiologic Research, June 2014, Seattle, WA.

21. How should we prioritize 'external validity' when aiming to conduct an epidemiology that matters? Symposium presentation, Society for Epidemiologic Research, June 2014, Seattle, WA.

22. Multi-national birth cohort trends in sensation seeking in the United States from 1976 to 2011. Symposium presentation, Society for Research on Adolescents, March 2014, Austin, TX.

23. Racial/ethnic differences in drinking in the US: paradoxes, problems, and research priorities. Research Society on Alcoholism, Symposium chair and presentation, June 2013, Orlando, FL.

24. The burden of loss: unexpected death and psychiatric disorders across the life course. International Society for Traumatic Stress Studies, Symposium presentation, November 2012, Los Angeles, CA.

25. The social norms of birth cohorts: age, period, and cohort effects in adolescent and adult binge drinking. Symposium presentation, Society for Research on Child Development, October 2012, Tampa, FL.

26. Thought disorders in the meta-structure of psychopathology. Symposium presentation, Research Society on Alcoholism, June 2012, San Francisco, CA.

27. Time Trends and Their Explanations. Symposium chair, Research Society on Alcoholism, June 2011, Atlanta, Georgia.

28. Novel Methods to Assess Societal-Level Causes of Alcohol Disorders Across Time and Place. Symposium chair, Research Society on Alcoholism, June 2010, San Antonio, Texas.

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*Keyes Report*

29. A multi-level framework for understanding birth cohort effects. Symposium presentation, Research Society on Alcoholism, June 2010, San Antonio, Texas.
30. A Comprehensive Approach to Age-Period-Cohort Analysis. Plenary session presentation, Society for Epidemiologic Research. June 2008, Chicago, IL.
31. Economic capital and problem alcohol use: the positive relationship between income and the DSM-IV alcohol abuse diagnosis. Symposium presentation, Research Society on Alcoholism, July 2007, Chicago, IL.
32. Keyes KM, Hasin DS. Birth cohort effects on gender differences in the risk for drug dependence. College on Problems of Drug Dependence. July 2006, Scottsdale, AZ.

\* Selected for Women & Gender Junior Investigator Award

*INTERNATIONAL*

1. War and Mental Health. World Psychiatric Association, March 2021, Bangkok, Thailand. Virtual.
2. Mental health and firearm violence: what role should disqualification criteria on firearm ownership play? Symposium presentation International Federation of Psychiatric Epidemiology, October 2017, Melbourne, Australia.
3. Mental health and firearm violence: Understanding social and environmental contexts on the path to prevention. Symposium chair, International Federation of Psychiatric Epidemiology, October 2017, Melbourne, Australia.
4. Transdiagnostic psychiatric disorder risk associated with early and late age of menarche: a latent modeling approach. Symposium presentation, International Federation of Psychiatric Epidemiology, October 2017, Melbourne, Australia.
5. Utilising epidemiology to guide innovative prevention for comorbid mental and substance use problems in young people. Symposium discussant, International Federation of Psychiatric Epidemiology, October 2017, Melbourne, Australia.
6. The influence of medical marijuana laws on adolescent and adult outcomes: current state evidence from the United States. Symposium presentation, World Psychiatric Association, October 2017, Berlin, Germany.
7. How healthy are survey respondents compared to the general population? A comparison of mortality rates from linked death records. Symposium presentation, World Psychiatric Association Epidemiology Section, April 2016, Munich, Germany.
8. Anxious and angry: course and comorbidity of intermittent explosive disorder and anxiety disorders in adolescence. Symposium presentation, International Federation of Psychiatric Epidemiology, October 2015, Bergen, Norway.
9. Trajectories of alcohol and cigarette use across the lifecourse: evidence from a pregnancy cohort. Symposium presentation, World Psychiatric Association, September 2014, Madrid, Spain.
10. Maternal alcohol consumption and offspring psychopathology. European Public Health Association Conference, Symposium presentation, November 2013, Brussels, Belgium.
11. Understanding the teenage brain in context: 35 years of adolescent sensation seeking in the United States. International Federation of Psychiatric Epidemiology, Symposium chair and presentation, June 2013, Leipzig, Germany.

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*Keyes Report*

609. Plaintiffs' Third Amended Complaint. *In re National Prescription Opiate Litigation*. 17-md-02804
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615. Powell D, Paucula RL, Taylor E. How Increasing Medical Access to Opioids Contributes to the Opioid Epidemic: Evidence from Medicare Part D. *NBER Work Pap Ser*. 2015;No. 21072. doi:10.3386/w21072
616. Preliminary 2018 Drug Overdose Death Statistics: Cuyahoga County, Ohio. Office of the Executive. <http://executive.cuyahogacounty.us/en-US/2018-Drug-Overdose-Death-Statistics.aspx>.
617. Prescott, John (2016) "Academic Medicine Responds to the Opioid Crisis," *Marshall Journal of Medicine*: Vol. 2: Iss. 4, Article 3. DOI: <http://dx.doi.org/10.18590/mjm.2016.vol2.iss4.3>
618. Prescription Drug Disposal Locations. Oct 25, 2019.
619. Prescription Drug Use and Misuse in the United States: Results from the 2015 National Survey on Drug Use and Health (NSDUH)
620. Proposed Opioid Response Plan for the State of West Virginia: Proposed Report for Public Comment January 10 2018
621. Public Children Services Association of Ohio. The Opioid Epidemic's Impact on Children Services in Ohio. PCSAO report on opioid epidemic's impact on children services in OH
622. Puja Seth, Lawrence Scholl, Rose A. Rudd, Sarah Bacon. Overdose Deaths Involving Opioids, Cocaine, and Psychostimulants — United States, 2015–2016. Morbidity and Mortality Weekly Report - US Dept of Health and Human Services/CDC - Vol. 67 No. 12
623. Putrich, G. BABY STEPS For drug-exposed infants, intensive care is too intense. *Nation & World*. Dec 22, 2017
624. R. Miech, et al., Prescription Opioids in Adolescence and Future Opioid Misuse, *Pediatrics*, Volume 136:e1169- 1177 (2015).
625. Rachel N. Lipari and Arthur Hughes. HOW PEOPLE OBTAIN THE PRESCRIPTION PAIN RELIEVERS THEY MISUSE. SAMHSA The CBHSQ Report

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*Keyes Report*

591. Opioid Prevention Program: Data to Action Fentanyl-related deaths in New York State outside of New York City, 2015-2017 February 2019 ([https://www.health.ny.gov/statistics/opioid/data/pdf/nysdoh\\_dta1\\_fentanyl.pdf](https://www.health.ny.gov/statistics/opioid/data/pdf/nysdoh_dta1_fentanyl.pdf))
592. Order governing production and de-identification of certain medical and pharmacy information. Supreme Court of the State of New York, dkt no 1359 index no 400000/2017
593. O'Rourke, A. et al. Acceptability of safe drug consumption spaces among people who inject drugs in rural West Virginia. Harm Reduction Journal volume 16, Article number: 51 (2019)
594. OSAM Drug Abuse Trends in the Cleveland Region, Drug Trend Report. June 2018-Jan 2019
595. OUD Over Time Graph
596. OUD Population at a Glance
597. OUD Population at a Glance map 2
598. Overdose Death Rates. National Institute on Drug Abuse. <https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates>. Published 2019.
599. Papadomanolakis-Pakis, Nicholas, et al. "Prescription opioid characteristics at initiation for non-cancer pain and risk of treated opioid use disorder: a population-based study." *Drug and Alcohol Dependence* (2021): 108601.
600. Park TW, Saitz R, Ganoczy D, Ilgen MA, Bohnert ASB. Benzodiazepine prescribing patterns and deaths from drug overdose among US veterans receiving opioid analgesics: case-cohort study. *BMJ*. 2015;350:h2698. doi:10.1136/bmj.h2698
601. Patrick SW, Schumacher RE, Benneyworth BD, Krans EE, McAllister JM, Davis MM. Neonatal Abstinence Syndrome and Associated Health Care Expenditures: United States, 2000-2009 Trends in Neonatal Abstinence Syndrome. *JAMA*. 2012;307(18):1934-1940. doi:10.1001/jama.2012.3951
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603. Paulozzi LJ, Baldwin GT, Franklin GM, et al. CDC Grand Rounds: Prescription Drug Overdoses—a U.S. Epidemic. *Morb Mortal Wkly Rep*. 2012;61(01):10-13.
604. Paulozzi LJ, Mack KA, Jones CM. Vital Signs: Risk for Overdose from Methadone Used for Pain Relief—United States, 1999-2010. *Morb Mortal Wkly Report*. 2012;61.
605. Paulozzi LJ, Ryan GW. Opioid Analgesics and Rates of Fatal Drug Poisoning in the United States. *Am J Prev Med*. 2006;31(6):506-511. doi:10.1016/j.amepre.2006.08.017
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607. Peiper NC, Clarke SD, Vincent LB, Ciccarone D, Kral AH, Zibbell JE. Fentanyl test strips as an opioid overdose prevention strategy: Findings from a syringe services program in the Southeastern United States. *Int J Drug Policy*. 2019. doi:10.1016/j.drugpo.2018.08.007
608. Physicians Assistants near Huntington, WV. Available at: <https://www.healthgrades.com/general-medicine-physicians-assistant-directory/wv-west-virginia/huntington>

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*Keyes Report*

12. Comorbidity of less common psychiatric disorders in the meta-structure of psychopathology. Symposium presentation, World Psychiatric Association, October 2012, Prague, Czech Republic.
13. How can thought disorders be conceptualized in the meta-structure of psychopathology? Symposium presentation, Life History Society, October 2012, Surrey, England.
14. Understanding family-based designs using Directed Acyclic Graphs. Symposium presentation, World Psychiatric Association Epidemiology Section, March 2012, Sao Paulo, Brazil.
15. Childhood Maltreatment and the Structure of Common Psychiatric Disorders. Symposium presentation, Society for Epidemiologic Research, June 2011, Montreal, Canada.
16. Methodological issues in the assessment of adverse childhood events. Symposium chair, Society for Epidemiologic Research, June 2011, Montreal, Canada.
17. Time as a multi-level risk factor: the impact of time period- and birth cohort-specific social norms on adolescent marijuana use, 1976-2007. Symposium presentation, École Des Hautes Études En Santé Publique, January 2010, Paris, France.
18. Challenging the paradigm of a “telescoping” phenomenon in gender differences for substance disorders: results of a cohort analysis in the U.S. population. Symposium presentation, International Federation of Psychiatric Epidemiology, April 2009, Vienna, Austria.

INVITED LECTURES

*REGIONAL*

1. Suicide and the agent-host-environment trial. Mailman School of Public Health, *Spatial Epidemiology and the Science of Place in Shaping Health Equity series*, March 2021, New York, NY. Virtual.
2. Age, period, and cohort effects: an introduction to conceptual and analytic issues. Mt Sinai Brookdale Department of Geriatrics and Palliative Medicine, January 2021, New York, NY. Virtual.
3. Trends in alcohol use in the 20<sup>th</sup> century: gender differences and implications for the decades to come. *Columbia Liver Transplant Lunch & Learn*. November, 2020, New York, NY. Virtual.
4. Using agent-based models to simulate the opioid epidemic: a critical review of the literature and proposed framework for New York State and beyond. HIV Intervention Science Training Program for Underrepresented New Investigators, August 2019, New York, NY.
5. Depression's got a hold of me: Gender differences and generational trends in alcohol use and mental health among US adolescents and adults. *Substance Abuse Epidemiology Training Program seminar*, Columbia University, October 2018, New York, NY.
6. Adolescent mental health and substance use in the 21<sup>st</sup> century: implications for research and prevention. NIAAA Webinar: Women, Drinking, and Pregnancy Working group. November 2018, Bethesda, MD.

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7. Depression's got a hold of me: Gender differences and generational trends in alcohol use and mental health among US adolescents and adults. Substance Abuse Epidemiology Training Program seminar, Columbia University, October 2018, New York, NY.
8. Depression's got a hold of me: Gender differences and generational trends in alcohol use and mental health among US adolescents and adults. Epidemiology and Biostatistics Seminar, Drexel University, November 2018, Philadelphia, PA.
9. Mental health over the life course: adolescence. National Academy of Sciences workshop: Women's Mental Health across the Life Course, March 7<sup>th</sup>, 2018. Washington DC.
10. Life Course Psychopathology: The Next Decade. American Psychopathological Association, invited talk, March 3<sup>rd</sup>, 2018. New York, NY.
11. As adolescent substance use declines, depression and suicidality increase: a tale across generations. NYU Population Health, Epidemiology Seminar Series. December 4<sup>th</sup>, 2017, New York, NY.
12. Historical and current trends in adolescent heavy alcohol use, depressive affect, and their relationship: implications for adolescent suicide in the United States. NIAAA Workshop to Explore Research Needs in Addressing Alcohol-Related Suicide, September 2017, National Institute of Alcohol Abuse and Alcoholism, Rockville, Maryland.
13. Alcohol use and morbidity across historical time: what does variation tell us about environmental determinants of alcohol-related outcomes? National Institute of Health Director's Wednesday Afternoon Lecture Series (WALS), May 2017, NIH, Bethesda, MD.
14. The role of epidemiology in population mental health in the 21<sup>st</sup> century: history, current progress, future directions. Population Health Research Seminar, October 2016, New York University, New York, NY.
15. How and why do psychiatric disorders change across time. Brain Health Colloquium, Harvard T.H. Chan School of Public Health, Seminar presentation, April 2016, Boston, MA.
16. The mathematical limits of genetic prediction for complex chronic disease. Symposium presentation, American Psychopathological Association, March 2016, New York, NY.
17. How and why do psychiatric disorders change across time. Institute for Translational Epidemiology, Mount Sinai School of Medicine, Seminar presentation, January 2016, New York, NY.
18. Psychiatric disorders among bereaved individuals. Grand Rounds speaker, Hartford Hospital Institute of Living, October 2014, Hartford, CT.
19. How can we intervene in neighborhoods to reduce racial/ethnic inequalities in alcohol-related homicide? Simulating in-silico counterfactuals. Partnership for a Healthier New York City, June 2014, New York, NY.
20. How can we intervene in neighborhoods to reduce racial/ethnic inequalities in alcohol-related homicide? Simulating in-silico counterfactuals. Innovations in Translating Injury Research Into Effective Prevention, May 2014, New York, NY.

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*Keyes Report*

574. NOWS Research
575. Number and Age-Adjusted Rates of Drug-Poisoning Deaths Involving Opioid Analgesics and Heroin: United States, 1999–2014.; 2015. [https://www.cdc.gov/nchs/data/health\\_policy/AADR\\_drug\\_poisoning\\_involving\\_OA\\_Heroin\\_US\\_2000-2014.pdf](https://www.cdc.gov/nchs/data/health_policy/AADR_drug_poisoning_involving_OA_Heroin_US_2000-2014.pdf).
576. Number of infant drug addiction cases in WV isn't decreasing. [https://www.herald-dispatch.com/news/number-of-infant-drug-addiction-cases-in-wv-isn-t/article\\_36bc2f96-3e01-11e8-8514-436d43c1dbf6.html](https://www.herald-dispatch.com/news/number-of-infant-drug-addiction-cases-in-wv-isn-t/article_36bc2f96-3e01-11e8-8514-436d43c1dbf6.html)
577. NYS Annual Reports <https://www.health.ny.gov/statistics/diseases/communicable/index.htm>
578. NYS DOH Communicable Disease Annual Reports and Related Information <https://www.health.ny.gov/statistics/diseases/communicable/index.htm>
579. NYS Health Foundation. Follow the Money: Pharmaceutical Manufacturer Payments and Opioid Prescribing Patterns in New York State. NYS Health Foundation
580. O'Brien C. Addiction and dependence in DSM-V. Addiction. 2011;106(5):866-867. doi:10.1111/j.1360-0443.2010.03144.x
581. O'Connell, L. Channel Anger Into Action. LinkedIn. Sept. 19, 2016
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21. Social norms, attitudes, and behavior: how do we harness intention for public health prevention? Columbia University Epidemiologic Science Symposium, April 2014, New York, NY

22. Age, period, and cohort effects: an introduction to theory and approaches to analysis. CUNY School of Public Health Epidemiology and Biostatistics Seminar Series. Invited lecture, November 2013, New York, NY.

23. Social norms and alcohol use: evidence and recommendations for New York City. Community Services Board Meeting, Invited lecture, New York City Department of Health, March 2013, New York, NY.

24. How does exogenous and endogenous hormone variation affect mental health? New designs for old problems. Psychiatric-Neurological Epidemiology Cluster Seminar, Invited lecture, Columbia University, February 2013, New York, NY.

25. The critical role of social norms in population health. Symposium presentation, Columbia University Epidemiology Scientific Symposium: Charting the Course of Social Epidemiology in the Next 25 Years. Symposium presentation, October 2012, New York, NY.

26. Time trends in alcohol use: Understanding cohort effects, Adult Psychiatry Grand Rounds, Columbia University Department of Psychiatry, May 2012, New York, NY.

27. The Epidemiology of Substance Use Disorders. Sexuality and HIV Seminar, HIV Center for Clinical and Behavioral Science. February 2011, New York, NY

*NATIONAL*

1. The role of epidemiology in assessing causes and interventions in mental health research in the 21<sup>st</sup> century: when does sampling matter? Bridging Science and Society retreat, National Institute of Mental Health, April 2021. Virtual.

2. Age, Period, and Cohort Effects in Alcohol Use in the 20<sup>th</sup> and 21<sup>st</sup> Century: implications for the decades to come. 50<sup>th</sup> Anniversary of the National Institute on Alcohol Abuse and Alcoholism symposium, NIAAA, December 2020. Virtual.

3. The Rapid Decline in Adolescent Mental Health in the 21st Century: Magnitude, Causes, and Public Health Implications. Dean's Seminar Series, College of Health and Human Services, George Mason University, January 2020.

4. The changing landscape of adolescent mental health and substance use in the 21<sup>st</sup> century. Epidemiology seminar, National Institute on Drug Abuse, March 2019, Bethesda, MD.

5. Depression's got a hold of me: Gender differences and generational trends in alcohol use and mental health among US adolescents and adults. Epidemiology seminar, Michigan State University, March 2019, Lansing, MI.

6. Psychiatric Disorders after Loss. Dean's Symposium on Death and Dying, Boston University School of Public Health, February 2019, Boston, MA.

7. Depression's got a hold of me: Gender differences and generational trends in alcohol use and mental health among US adolescents and adults. Epidemiology seminar, University of Pittsburgh School of Public Health, February 2019, Pittsburgh, PA.

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*Keyes Report*

8. Does epidemiology matter? Epidemiology and population health science in the 21<sup>st</sup> century. Johns Hopkins School of Public Health, Epidemiology Centennial Symposium, November 2018, Baltimore, MD.
9. Opioid use, disorder, and mortality: past, present, and evidence-based control strategies. Mass Torts Made Perfect conference, invited talk, April 2018, Las Vegas, NV.
10. The epidemiology of opioid use, opioid disorder, and overdose in the United States: past, present, and evidence-based control strategies. Keynote address, Kentucky Association of Counties annual conference, November 2017, Louisville, Kentucky.
11. Fundamentals of age-period-cohort analysis. Epidemiology Seminar Series, February 2017, University of California San Francisco, San Francisco, California.
12. The role of epidemiology in population mental health in the 21<sup>st</sup> century: history, current progress, future directions. Epidemiology Seminar Series, November 2016, Virginia Commonwealth University, Richmond, Virginia.
13. Alcohol use and morbidity across historical time: what does variation tell us about environmental determinants of alcohol-related outcomes? Plenary talk, Research Society on Alcoholism, June 2016, New Orleans, LA.
14. Using complex systems modeling to examine alcohol-attributable homicide in New York City. Invited lecture, Injury Prevention Research Center, Office of the Vice-Chancellor for Research, Social Epidemiology Program, Epidemiology Department, Gillings School of Global Public Health, University of North Carolina. October 2015, Chapel Hill, NC.
15. Racial/ethnic differences in substance use across the life course. Grand Rounds speaker, Alcohol Research Group. November 2014, Berkeley, California.
16. A brief introduction to age-period-cohort methodology. SER Experts presentation, Society for Epidemiologic Research, June 2014, Seattle, WA.
17. Time in the causal landscape: problems and possibilities in age-period-cohort research. Survey Research Center, February 2010, Ann Arbor, Michigan.

*INTERNATIONAL*

1. The mental health of adolescents in the 21<sup>st</sup> century: time trends and how they inform etiology. Leaders in Prevention Summit, August 2020, Sydney, Australia. Virtual.
2. Does epidemiology matter? Epidemiology and population health science in the 21<sup>st</sup> century. University College London Department of Psychiatry, April 2019, London, England.
3. How health disparities are obscured and underreported in national survey data, and implications for policy. University of Glasgow, April 2019, Glasgow, Scotland.
4. Depression's got a hold of me: Gender differences and generational trends in alcohol use and mental health among US adolescents and adults. Centro de Investigación en Sociedad y Salud, Universidad Mayor, November 2018, Santiago, Chile.
5. The role of epidemiology in population mental health in the 21<sup>st</sup> century: history, current progress, future directions. Seminar Series, April 2017, French National Institute of Health and Medical Research (INSERM), Paris, France.

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*Keyes Report*

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541. Nabarun Dasgupta, Kenneth D. Mandl, John S. Brownstein. Breaking the News or Fueling the Epidemic? Temporal Association between News Media Report Volume and Opioid-Related Mortality. *PLoS ONE* 4(11): e7758
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548. Nash, B. Cabell Huntington registered nurses begin seeking union representation. [https://www.herald-dispatch.com/news/cabell-huntington-registered-nurses-begin-seeking-unionrepresentation/article\\_42cf7177-58de-5bfe-af74-411ab2da4f8b.html](https://www.herald-dispatch.com/news/cabell-huntington-registered-nurses-begin-seeking-unionrepresentation/article_42cf7177-58de-5bfe-af74-411ab2da4f8b.html)
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551. Nathan Hartle Deposition Testimony Excerpts – MDL 2804, Volume 1, July 31, 2018
552. National Academies of Science Engineering and Medicine (NASEM). *Pain Management and the Opioid Epidemic: Balancing Societal and Individual Benefits and Risks of Prescription Opioid Use*; 2017. doi:10.17226/24781
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537. Muhuri PK, Gfroerer JC, Davies C. Associations of nonmedical pain reliever use and initiation of heroin use in the United States. 2013.

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539. Munzing T. Physician guide to appropriate opioid prescribing for noncancer pain. *Perm J*. 2017;21:16-169. doi:10.7812/TPP/16-169

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6. The role of epidemiology in population mental health in the 21<sup>st</sup> century: history, current progress, future directions. Seminar Series, August 2017, National Institute of Occupational Health, Oslo, Norway.

7. The role of epidemiology in population mental health in the 21<sup>st</sup> century: history, current progress, future directions. Key note address, Epidemiology Student Research Day, April 2017, McGill University, Montreal, Canada.

8. The role of epidemiology in population mental health in the 21<sup>st</sup> century: history, current progress, future directions. Epidemiology Seminar Series, April 2017, University of Capetown, Capetown, South Africa.

9. Why does epidemiology matter? Invited lecture, International Journal of Epidemiology Conference, October 2016, Bristol, UK.

10. Cohort studies in epidemiology: considering cross-generational influences on health. Invited speaker, World Psychiatric Association Epidemiology Section, April 2016, Munich, Germany.

11. How and why do psychiatric disorders change across time. Canadian Association of Psychiatric Epidemiology, Keynote speaker, September 2015, Vancouver, Canada.

12. Advances in age, period, and cohort effect analysis. Faculty of Health Sciences Research Seminar Series, Invited lecture, September 2015, Vancouver, Canada.

13. The burden of loss: unexpected death and psychiatric disorders across the life course. Symposium presentation, World Psychiatric Association Epidemiology Section, October 2014, Nara, Japan.

14. Age, period, and cohort effects: an introduction to theory and approaches to analysis. University of Manitoba Clinical Health Sciences, Department of Psychiatry, Invited lecture, January 2013, Winnipeg, Canada.

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Exh. A-53

*Keyes Report*

## Katherine Keyes, PhD Expert Report

MDL Case Track 3  
Case No. 1:18-op-45032 and No. 1:18-op-45079 Opioid Litigation

# EXHIBIT B

## Materials Considered

Exh. B-1

*Keyes Report*

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519. McKesson Corporation Agrees to Pay More than \$13 Million to Settle Claims that it Failed to Report Suspicious Sales of Prescription Medications. USDOJ
520. McKinney, Ralph E., "Barriers to Employment: A Substance Abuse Story" (2019). Faculty Research Day. 7.
521. McLellan, Turner. Prescription Opioids, Overdose Deaths, and Physician Responsibility. *JAMA The Journal of the American Medical Association*
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523. Meltzer EC, Rybin D, Saitz R, et al. Identifying prescription opioid use disorder in primary care: diagnostic characteristics of the Current Opioid Misuse Measure (COMM). *Pain.* 2011;152(2):397-402. doi:10.1016/j.pain.2010.11.006
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Exh. B-29

*Keyes Report***Dr. KATHERINE KEYES MATERIALS CONSIDERED**

1. 2010 MAT treatment SAMHSA
2. 2012.03.07 CAH v Holder et al. Memorandum of Opinion. Case 1:12-cv-00185-RBW
3. 2016 West Virginia Overdose Fatality. [https://dhhr.wv.gov/bph/Documents/ODCP Reports 2017/2016 West Virginia Overdose Fatality Analysis\\_004302018.pdf](https://dhhr.wv.gov/bph/Documents/ODCP Reports 2017/2016 West Virginia Overdose Fatality Analysis_004302018.pdf)
4. 2016 OD Death Demographics Report
5. 2016 WV Overdose Fatality Analysis. Healthcare Systems Utilization, Risk Factors, and Opportunities for Intervention.
6. 2016.12.22 U.S. v Kinray, LLC. Consent decree. Case 1:16-cv-09767-RA
7. 2017 State Profile — West Virginia National Survey of Substance Abuse Treatment Services (N-SSATS) SAMHSA
8. 2017.08.17 Hartman email ABDCMDL00571804\_image (004)
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374. Huntington Resiliency Plan Educational-Vocational Services Meeting Minutes 6-28

375. Huntington Resiliency Plan Healthy Communities-Social Supports Workgroup Meeting Minutes 6-26

376. Huntington Resiliency Plan Inpatient-Residential Services Workgroup Meeting Minutes 6-28

377. Huntington Resiliency Plan Legal-Policy-First Responders Workgroup Meeting Minutes 7-3

378. Huntington Resiliency Plan Outpatient Services Workgroup Meeting 6-25

379. Huntington Resiliency Plan Prevention Workgroup Meeting Minutes 6-26

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152. Communication with Chuck Zerkle – Cabell County Sheriff

153. Communication with David Chaffin, MD, FACOG – Professor, Marshall University

154. Communication with Ellen A. Thompson, MD – Professor, Marshall Health, Huntington, West Virginia

155. Communication with Gordon Merry – Cabell County EMS Director

156. Communication with Hank Dial – City of Huntington Police Chief

157. Communication with Jan Rader – City of Huntington Fire Chief

158. Communication with Kathleen Mezsarov – Trumbull Medical Examiner's Office, Trumbull County, Ohio

159. Communication with Keith Thomas – Coordinator of Student Support, Cabell County Schools

160. Communication with Kelly Watts – Assistant Superintendent, Division of Instruction and Leadership, Cabell County Schools

161. Communication with Kim Fraser – Director of ADAMHS Board, Lake County, Ohio

162. Communication with Lauren Thorp – Trumbull County Mental Health and Recovery Board, Trumbull County, Ohio

163. Communication with Lyn O'Connell, PhD – Associate Director of Addiction Sciences, Marshall Health

164. Communication with Marcia Knight – Director of Education, Cabell County EMS

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- 165. Communication with Mark Komar – County Coroner, Lake County, Ohio
- 166. Communication with Mary Pshock – County Coroner’s Office, Lake County, Ohio
- 167. Communication with Michael Kilkenny, MD – Director, Cabell County Department of Public Health
- 168. Communication with Ray Cornwell – City of Huntington Police Captain
- 169. Communication with Rocky Johnson – City of Huntington Police Department, Police Captain, Special Investigations Bureau (Former)
- 170. Communication with Sean Loudin, MD – Associate Professor, Marshall University School of Medicine
- 171. Communication with Stephen Petranay, MD – Chair of Family & Community Health, Marshall University School of Medicine
- 172. Communication with Steve Murray – Assistant Director, Cabell County EMS
- 173. Communication with Steve Williams – Mayor of Huntington
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240. Deposition Transcript of Jan Rader

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Exh. B-16